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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/923,670	08/07/2001	Hag-ju Cho	5649-877	1538

20792 7590 12/20/2002
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EXAMINER

THOMAS, TONIAE M

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 12/20/2002

10

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/923,670

Examiner

Toniae M. Thomas

Applicant(s)

CHO ET AL.

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 42-72 is/are pending in the application.
- 4a) Of the above claim(s) 42-57 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 58-61 and 70-72 is/are rejected.
- 7) ☒ Claim(s) 62-69 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3, 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. This is a first Office action on the merits of Application 09/923,670. Currently, claims 42-72 are pending.

Election/Restrictions

2. Applicant's election of the species of figs. 1A, 1B, 2A-2C, and 3A-3C (claims 58-72) with traverse in Paper No. 9 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Claims 42-57 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a non-elected species, there being no allowable generic or linking claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. *Claims 58-61, 71, and 72 are rejected under 35 U.S.C. 102(e) as being anticipated by Kanaya et al. (US 2002/0063274 A1).*

Kanaya et al. disclose a method of forming a protective structure for a ferroelectric dielectric region on an integrated circuit substrate (see Abstract, figs. 20A-20C and par. [0126] to par [0134]). The method comprises the following steps: depositing a first metal oxide layer 114 directly on a surface of the ferroelectric dielectric region 113 (fig. 20B and par. [0128]); annealing the first metal oxide layer and the ferroelectric dielectric region (par. [0128]); and depositing a second metal oxide layer 121 on the first metal oxide layer (fig. 20C and par. [0129]).

The first metal oxide is sufficiently thin enough to enable remnant polarization of the ferroelectric dielectric region to increase during the annealing of the first metal oxide layer and the ferroelectric dielectric region (par. [0128]).¹

The first metal oxide layer 114 and the ferroelectric dielectric region 113 are annealed in a manner sufficient to increase the remnant polarization of the ferroelectric dielectric (par. [0128]).

The first metal oxide layer 114 is sufficiently thick enough to reduce diffusion of hydrogen into the dielectric region during the depositing of the second metal oxide layer (par. [0128]).²

The ferroelectric dielectric region 113 is a capacitor dielectric, and comprises PZT (par. [0126]).

¹ Kanaya et al. disclose forming the first metal oxide layer 114 to a thickness of 300 nm, which is sufficiently thin enough to enable remnant polarization.

² Kanaya et al. disclose forming the first metal oxide layer to a thickness of 2000 nm, which is thick enough to reduce diffusion of hydrogen during the depositing of the second metal oxide layer 121.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. *Claim 70 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kanaya et al. in view of Larson et al. (US 5,216,572 B1).*

Kanaya et al. do not teach that the first and second metal oxide layers are deposited by one of atomic layer deposition (ALD), low pressure CVD, high pressure CVD, plasma CVD, or CVD.

Larson et al. disclose a method for forming ferroelectric capacitors (4(a)-4(g) and accompanying text). The method comprises depositing a PZT layer 24 using a CVD process (fig. 4(c) and col. 4, lines 28-41).

Kanaya et al. teach depositing the first and second metal oxide layers using either a sol-gel spin coating process, or a sputtering process (par. [0128] and par. [0129]). Larson et al. teach that CVD may be used in addition to sol-gel, and sputtering for the deposition of a PZT film (col. 4, lines 38-41).

It would have been obvious to one having ordinary skill in the art to deposit the first and second metal oxide layers using CVD because, as Larson et al. teach, CVD is an alternate deposition process that may be used in place of sputtering and sol-gel processes to form a PZT film.

Allowable Subject Matter

5. Claims 62-69 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 62 would be allowable if rewritten as discussed above because the prior art of record does not anticipate, teach or suggest forming the first and second metal oxide layers of a metal selected from the following group: Al_2O_3 , TiO_2 , ZrO_2 , Ta_5O_3 , and CeO_2 . Claims 63-69 would be allowable if rewritten as discussed above because the prior art of record does not anticipate, teach or suggest forming the first and second metal oxide layers such that the second metal oxide layer 121 is thicker than the first metal oxide layer 114.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toniae M. Thomas whose telephone number is (703) 305-7646. The examiner can normally be reached on Monday through Thursday from 8:00 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (703) 308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

TMJ

December 16, 2002


**AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800**